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| Lesson Title: | | Adopt an Element | | | | | | | | | |
| **Teacher:** | Santoro | | **Hour:** | | Science Periods 1,2,4,5,7 | | | | | | |
| **Week:** | Last two weeks (2 day in class project) | | **Date:** | | Trimester 2-3 (March 7th – 28th) Most of this project was completed outside of class. | | | | | | |
| **Unit:** | Earth Systems | | **Target Grade Level:** 6th | | | | | | | | |
| **Course:** | Science | |  |  | |  |  |  |  |  |  |

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| **Learning Target(s):** | Know and understand common properties, forms and changes in matter and energy. |
| **Criteria for Success:** | Draw the atom using the correct number of particles (protons, neutrons, and electrons) |
| **Progression of Learning:** | 1. What makes something a building block? 2. Work in groups using the writing process to effectively communicate an understanding of the particle model of matter. 3. Use technology to research and share findings about historical explanations for the nature of matter. 4. Create models that explain the particle theory of matter. 5. Use models and electronic media to show and understand how molecules are made of atoms. 6. Understand how different arrangements of atoms provide different properties. |

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| **Content Area Standards, Essential Learnings, and Evidence Outcomes** | **21st Century Skills and Abilities** | **ISTE NET-S, ITEEA, or L4L Standards Addressed** |
| Standard 1: Physical Science- Students know and understand common properties, forms and changes in matter and energy.   * 1. All matter is made of atoms, which are far too small to see directly through a light microscope. Elements have unique atoms and thus, unique properties. Atoms themselves are made of even smaller particles.  1. Identify evidence that suggests there is a fundamental building block of matter. 2. Use the particle model of matter to illustrate characteristics of different substances. 3. Develop an evidence based scientific explanation of the atomic model as the foundation for all chemistry. 4. Find and evaluate appropriate information from reference books, journals, magazines, online references, and databases to compare and contrast historical explanations for the nature of matter.    1. Atoms may stick together in well-defined molecules or be packed together in large arrays. Different arrangements of atoms into groups compose all substances. 5. Explain the similarities and differences between element sand compounds.    1. The physical characteristics and changes of solid, liquid, and gas states can be explained using the particulate model.   b. Distinguish between changes in temperature and changes of state using the particle model of matter. | * Collaboration and Teamwork * Critical Thinking, Reasoning, and Problem Solving * Invention, Innovation, and Creativity * Self-Direction * Information Literacy * Global Awareness * Inquiry Questions * Relevance and Application * Nature of Discipline | Standard 1: Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.   1. Apply existing knowledge to generate new ideas, products, or processes. 2. Create original words as a means of personal or group expression. 3. Use models and simulations to explore complex systems and issues.   Standard 2: Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.   1. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media. 2. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.   Standard 3: Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.   1. Plan strategies to guide inquiry. 2. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. 3. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks. 4. Process data and report results.   Standard 4: Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tolls and resources.  b. Plan and manage activities to develpp a solution or complete a project.  c.Collect and analyze data to identify solutions and/or make informed decisions.  Standard 5: Digital Citizenship- Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.   1. Advocate and practice safe, legal, and responsible use of information and technology. 2. Exhibit a positive attitude towards using technology that supports collaboration, learning, and productivity. 3. Demonstrates personal responsibility for lifelong learning. 4. Exhibits leadership for digital citizenship.   Standard 6: Technology Operations and Concepts- Students demonstrate a sound understanding of technology concepts, systems, and operations.   1. Understand and use technology systems. 2. Select and use applications effectively and productively. 3. Troubleshoot systems and applications. 4. Transfer current knowledge to learning of new technologies. |

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| **Pre-Assessment Summary** |  | **Post-Assessment Summary** |
| Before the Adopt an Element assignment was given, students became familiar with my website santorosciencerocks.pbworks.com. Many of them had used the website before for the Glog project and for the See the USA unit project. Students had several opportunities to view my website for assignments prior to this assignment. These assignments were also part of my pre-assessment, during which I figured out how familiar my students were with navigating around my website. This also showed me how comfortable individual students were with technology. |  | Students were assessed on three pieces of the project; “Adopt an Element” paper, “Adopt an Element” webpage on pbworks, and the “Adopt an Element” atom poster. Students were graded 20 points on the poster, 15 points on the paper, and 15 points on the webpage. If students were interested, they did a 3-dimentional model of their atom (10 points extra credit). I used this as an extension for students to push them above and beyond for this project. Not all students choose to do this, or were encouraged to do the 3-D model part of the project. |
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| **Summary of Differentiation Strategies and Students** |  | **Summary of Research Based Instruction Strategies** |
| Individual differentiation for each kid wall included in the assignment grade.  Differentiation for the project was included for each student. I monitored which students needed differentiation on the work itself. Some students were instructed to do the bare-minimum of the work on the rubric, while others were expected to go above and beyond.  Some students were encouraged to create 3-dimentional models for their atoms including a particle key of protons, neutrons, and electrons. Many of the atom models were very creative, and students put a lot of time into making them look as realistic as possible. I found that this helped some students to visually be able to see how the particles create atoms. |  | During the 21st century, students are more engaged with technology then ever before. Technology is a part of their everyday world, and by including it in education, students will better connect with the content.  According to the article, “Using Technology to Enhance Engaged Learning for At-Risk Student,” technology based learning helps students to achieve higher level thinking and skills. Technology based instruction, also allows students to get more meaningful lessons. When students are engaged, they will retain more from the lesson and learning. Technology is a huge part of our student’s lives, and it is important that we use types of technology that can help them achieve these higher order skills that can help them in the real world.  During my lesson and unit plans, I was able to use several different technologies to incorporate my projects and ideas into.  During this lesson, I used a pbworks account in order to help guide my students and show them online examples. Instead of using paper for this project, I solely used my webpage <http://santorosciencerocks.pbworks.com/w/page/31756322/Santoro-Science-Rocks>!  In order to communicate information to my students. This enabled me to communicate with them inside as well as outside of school. I created individual accounts for each student so that they could explore and publish using their own personal webpages. I used a template to guide the students and several websites on my website that they used to answer questions and diagram information.    When students are evaluated through state standardized tests, the question always raised is “Are kids getting as much out of their classrooms as they need to in order to master essential criteria for each subject are?” According to the article “Using Technology to Enhance Connections Between Home and School,” students learn best when they can access computer connections at home. The amount of young people using computers is on the rise at a rapid rate. In 1984, just 8% of all households owned a home computer, but by 2001, and estimated 51% owned (Penuel). Computer technology increases student engagement and involvement in education. It is thought that by using new technology, parent involvement is also increased because parents can access and monitor their child with projects and assignments in school. This has a positive influence on the student, if the student is aware that their parent values education as much as they do.  In 1995, a group of researchers, from the National Science Foundation’s Longitudinal Study of American Youth, examined close relationships between having computers at home and academic achievement. Researchers found much higher grades in math and English from students who had computers at home, than students without computers. These students also attained higher levels of technology proficiency. It was also found that students that used computer technology more frequently were more likely to pass state standardized tests.  From this research, I agree that the use of technology enhances student learning. It engages students, and enables them to be an active participant in academics. I will continue to use technology in my classroom to attain higher growth and involvement amongst my students.  Citations:  "Using Technology to Enhance Engaged Learning for At-Risk Students." Web. 19 Jan. 2011. <http://www.ncrel.org/sdrs/areas/issues/students/atrisk/at400.htm>.  Penuel, William; Allen Jacob. “Using Technology to Enhance Connections Between Home and School.” Planning and Evaluation Service, U.S. Department of Education. |

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| **Technology Materials and Resources** |  | **Other Materials and Resources** |
| -Glogster  -http://santorosciencerocks.pbworks.com  (pbworks)  Teacher Resources: The ISTE NETS and Performance Indicators for Teachers (NETS – T)  Standard 1: Facilitate and Inspire Student Learning and Creativity- Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.   1. Promote, support, and model creative and innovative thinking and inventiveness 2. Engage students in exploring real-word issues and solving authentic problems using digital tools and resources. 3. Promote student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes. 4. Model collaborative knowledge construction by engaging in learning with students, collogues, and others in face-to-face and virtual environments.   Standard 2: Design and Develop Digital-Age Learning Experiences and Assessments-Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS – S Teachers:   1. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote students learning and creativity. 2. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress. 3. Customize and personalize learning activities to address students’ diverse learning styles, working strategies, and abilities using digital tools and resources.   d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.  Standard 3: Model Digital-Age Work and Learning- Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.   1. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations. 2. Collaborate with students and peers using digital tools and resources to support students’ success and innovation. 3. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital-age media and formats. 4. Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning.   Standard 4: Promote and Model Digital Citizenship and Responsibility- Teachers understand logical and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices. Teachers:   1. Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources. 2. Address the diverse needs of all learners by using learner-centered strategies and providing equitable access to appropriate digital tools and resources.   5. Engage in Professional Growth and Leadership  Teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources. Teachers:   1. Participate in local and global learning communities to explore creative applications of technology to improve student learning.   c. Evaluate and reflect on current research and professional practices on a regular basis to make effective use of existing and emerging digital tools and resources in support of student learning.  d. Contribute to the effectiveness, vitality, and self-renewal of the teaching profession and of their school and community. |  | -Chemical Building Blocks Textbooks  -Notes, TAG’s, Guided Readings, Section Reviews  -Labs/Activities (group and individual)  -Adopt an Element paper  -Adopt an Element webpage  -Atom poster  -3-D model materials  http://santorosciencerocks.pbworks.com/w/page/31756322/Santoro-Science-Rocks! (my website) |

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| **Student Self-Assessment Strategies** |  | **Student Goal Setting Strategies** |
| Students were given the “Adopt an Element” paper, which acted as a rubric. Students were supposed to fill out the paper before filling out their webpage on the computer. On the “Adopt an Element” paper, is the rubric and instructions for the poser, and for the 3-D model. Students were able to assess themselves with the rubrics given for the project. |  | Students set individual goals as to how they would complete the project. Since we only spent two days in the computer lab during class, students had to come up with resources and ways that they could complete this project on their own time.  The students that constructed the 3-D model also set goals as to what they wanted their models to look like, and how the particles on their models would be arranged. Students set goals as to what materials to use. |

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| **Tier 1 Interventions (Universal) and Students** |  | **Strategically Planned Questions** |
| Students were given my website to obtain all the in formation for the project.  <http://santorosciencerocks.pbworks.com/w/page/31756322/Santoro-Science-Rocks>!  All students were given the following three items:  -“Adopt an Element” paper  -“Adopt an Element “webpage  -Atom poster  The teacher monitored each student throughout the two-class period to set the pace for the class. The students were able to communicate with the teacher using the website above. |  | How do atomic models shape all objects on Earth?  How are particles arranged to construct a 3-D model?  How is the particle arrangement important in determining elements?  How are chemical formulas constructed and helpful in identifying elements? |

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| **Tier 2 Interventions (Targeted) and Students** |  | **Vocabulary** |
| Students were selected based on ability level for extensions or modifications.  Modifications included help with direction from teacher as to what resources to use to find information. The elements for these students were not very large consisting of mostly; Na, C, N. This student also had less work to complete regarding the project (for example, I took out the dates and discoverer’s for some students since that wasn’t pertinent information to the project itself.  Extensions for students included elaborate atom posters using different materials or larger poster boards, as well as creating a 3-D model of their atom. These students were also given larger elements to construct with more orbital shells.  I found that some lower-achieving students enjoyed the 3-D model project. |  | Atom, molecule, proton, neutron, electron, positive charge, negative charge, orbital, shell, periodic table, discoverer, react, chemical bond, physical change, bonding, reaction, period, group, family, atomic number, atomic mass, symbol, row, column |

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| **Tier 3 Interventions (Intensive) and Students** |  | **ELL Strategies** |
| This intervention is for exceptional kids as well as extremely low achieving students.  For the exceptional achieving students, they were instructed to base their projects around an element with many protons, neutrons, and electrons. When they did their drawings and created their 3-D models the atoms wound up taking a lot of thought and effort. These models wound up being very large and intricate.  For the very low achieving student, minimal tasks were required. These students had the smallest element with the lowest number of protons, neutrons, and electrons, as well as help from another teacher or student on their drawings. The elements these students used were H and He (the smallest elements on the periodic table). |  | Written directions, oral directions, and web directions on my website <http://santorosciencerocks.pbworks.com/w/page/34811999/Glogster>  were given to help these students navigate around the project. An example is given on my website as well, and step by step directions were demonstrated during class with visuals. |

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|  | Activities and Lesson Procedures | Pacing |
| **Motivation (hook)** | For this project, you will adopt an element and create your very own webpage! | 5 Minutes |
| **Introduction** | Objective: I can create a web page for my very own element.  Warm up: Explain the difference between the following particles; protons, neutrons, and electrons.  Illustrate the atomic structure of a helium atom. (Remember to place the correct particles inside the nucleus as well as inside of the electron shells.) | 4 Minutes |
| **Direct Teaching** | Santorosciencerocks directions: We went to the computer lab several times before this lesson so that the students could become familiar with my website santorosciencerocks.pbworks.com. The students were instructed to navigate around the page, and find specific information.  Students were each given an element to research. I gave an example and demonstrated the processes and steps to follow. | 1 Class Period |
| **Guided Practice** | Students were given their own web page under my pbworks website. They were also given websites as research tools. Students researched their element and wrote down the information on their “Adopt an Element” packet. Then, they were able to transfer that information over to their web page. | 2  Weeks |
| **Feedback** | Daily feedback is given to individual students. The “Adopt an Element” packet and web-page was the rubric and acted as a feedback tool allowing students to criticize their own projects and make improvements accordingly. |  |
| **Independent Practice** | Students were given two days in the computer lab to work on their web pages and research, and many of them were able to find time at home, during study skills, before, or after school to complete this assignment. After looking at the rubric, example, and giving oral directions and support, students worked on there web-pages independently. Students also designed their atom poster in class. If individuals wanted to construct the 3-dimentional atom model for extra credit, they did this at home. | 2 Class Priods to create Atom Poster |
| **Closure** | Students published their “Adopt an Element” papers, Web-pages, atom poster, and 3-D atomic model for extra credit.  Students were graded according to the rubric given to them at the beginning of the project. |  |